SEQUENCE LISTING

Rother, Russell P.
Faas-Knight, Susan
Wu, Dayang
Carr, Francis J.
Hamilton, Anita

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gcccccctga cgagcatcac aaaaatcgac gctcaagtca gaggtggcga acccgacag     4380

gactataaag ataccaggcg tttcccctg gaagctccct cgtgcgctct cctgttccga     4440

ccctgccgct taccggatac ctgtccgcct ttctcccttc gggaagcgtg gcgctttctc    4500

aatgctcacg ctgtaggtat ctcagttcgg tgtaggtcgt tcgctccaag ctgggctgtg    4560

tgcacgaacc ccccgttcag cccgaccgct gcgccttatc cggtaactat cgtcttgagt    4620

ccaacccggt aagacacgac ttatcgccac tggcagcagc cactggtaac aggattagca    4680

gagcgaggta tgtaggcggt gctacagagt tcttgaagtg gtggcctaac tacggctaca    4740

ctagaaggac agtatttggt atctgcgctc tgctgaagcc agttaccttc ggaaaaagag    4800

ttggtagctc ttgatccggc aaacaaacca ccgctggtag cggtggtttt tttgtttgca    4860

agcagcagat tacgcgcaga aaaaaaggat ctcaagaaga tcctttgatc ttttctacgg    4920

ggtctgacgc tcagtggaac gaaaactcac gttaagggat tttggtcatg agattatcaa    4980

aaaggatctt cacctagatc cttttaaatt aaaaatgaag ttttaaatca atctaaagta    5040

tatatgagta aacttggtct gacagttacc aatgcttaat cagtgaggca cctatctcag    5100

cgatctgtct atttcgttca tccatagttg cctgactccc cgtcgtgtag ataactacga    5160

tacgggaggg cttaccatct ggccccagtg ctgcaatgat accgcgagac ccacgctcac    5220

cggctccaga tttatcagca ataaaccagc cagccggaag ggccgagcgc agaagtggtc    5280

ctgcaacttt atccgcctcc atccagtcta ttaattgttg ccgggaagct agagtaagta    5340
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gttcgccagt taatagtttg cgcaacgttg ttgccattgc tacaggcatc gtggtgtcac    5400

gctcgtcgtt tggtatggct tcattcagct ccggttccca acgatcaagg cgagttacat    5460

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aatagtgtat gcggcgaccg agttgctctt gcccggcgtc aatacgggat aataccgcgc    5700

cacatagcag aactttaaaa gtgctcatca ttggaaaacg ttcttcgggg cgaaaactct    5760

caaggatctt accgctgttg agatccagtt cgatgtaacc cactcgtgca cccaactgat    5820

cttcagcatc ttttactttc accagcgttt ctgggtgagc aaaaacagga aggcaaaatg    5880

ccgcaaaaaa gggaataagg gcgacacgga aatgttgaat actcatactc ttcctttttc    5940

aatattattg aagcatttat cagggttatt gtctcatgag cggatacata tttgaatgta    6000

tttagaaaaa taaacaaata ggggttccgc gcacatttcc ccgaaaagtg ccacctg       6057
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<210> 8
<211> 235
<212> PRT
<213> human

<400> 8

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Met Lys Trp Ser Trp Val Ile Leu Phe Leu Leu Ser Val Thr Ala Gly
1               5                   10                  15


Val His Ser Gln Val Gln Val Gln Gln Ser Gly Ala Glu Leu Ala Arg
                20              25                  30


Pro Trp Ala Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Asn Phe
            35                  40                  45


Asn Ser Tyr Trp Met Gln Trp Val Lys Gln Arg Pro Gly Gln Gly Leu
        50                  55                  60


Glu Trp Ile Gly Ala Ile Tyr Pro Gly Asp Gly Asp Thr Ser Tyr Thr
65                  70                  75                  80


Gln Lys Phe Arg Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser
                85                  90                  95


Thr Ala Tyr Met Gln Leu Ser Ser Leu Ala Ser Glu Asp Ser Ala Val
            100                 105                 110


Tyr Tyr Cys Ala Arg Arg Thr Val Gly Gly Tyr Phe Asp Tyr Trp Gly
            115                 120                 125
```

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```
Gln Gly Thr Thr Leu Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
    130             135             140
```

```
Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
145             150             155             160
```

```
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
            165             170             175
```

```
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
            180             185             190
```

```
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
        195             200             205
```

```
Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His
    210             215             220
```

```
Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
225             230             235
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<210> 9
<211> 2026
<212> DNA
<213> human

<400> 9
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ggcccagctc tgtcccacac cgcggtcaca tggcaccacc tctcttgcag cctccaccaa   240

gggcccatcc gtcttccccc tggcgccctg ctccaggagc acctccgaga gcacagccgc   300

cctgggctgc ctggtcaagg actacttccc cgaaccggtg acggtgtcgt ggaactcagg   360

cgccctgacc agcggcgtgc acaccttccc ggctgtccta cagtcctcag gactctactc   420

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aggcacaggc tgggtgcccc tacccccaggc ccttcacaca caggggcagg tgcttggctc   780

agacctgcca aaagccatat ccgggaggac cctgcccctg acctaagccg accccaaagg   840

ccaaactgtc cactccctca gctcggacac cttctctcct cccagatccg agtaactccc   900
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aatcttctct ctgcagagcg caaatgttgt gtcgagtgcc caccgtgccc aggtaagcca        960

gcccaggcct cgccctccag ctcaaggcgg gacaggtgcc ctagagtagc ctgcatccag       1020

ggacaggccc cagctgggtg ctgacacgtc cacctccatc tcttcctcag caccacctgt       1080

ggcaggaccg tcagtcttcc tcttcccccc aaaacccaag gacaccctca tgatctcccg       1140

gacccctgag gtcacgtgcc tggtggtgga cgtgagccag gaagaccccg aggtccagtt       1200

caactggtac gtggatggcg tggaggtgca taatgccaag acaaagccgc gggaggagca       1260

gttcaacagc acgtaccgtg tggtcagcgt cctcaccgtc ctgcaccagg actggctgaa       1320

cggcaaggag tacaagtgca aggtctccaa caaaggcctc ccgtcctcca tcgagaaaac       1380

catctccaaa gccaaaggtg ggacccacgg ggtgcgaggg ccacatggac agaggtcagc       1440

tcggcccacc ctctgccctg ggagtgaccg ctgtgccaac ctctgtccct acagggcagc       1500

cccgagagcc acaggtgtac accctgcccc catcccagga ggagatgacc aagaaccagg       1560

tcagcctgac ctgcctggtc aaaggcttct accccagcga catcgccgtg gagtgggaga       1620

gcaatgggca gccggagaac aactacaaga ccacgcctcc cgtgctggac tccgacggct       1680

ccttcttcct ctacagcagg ctaaccgtgg acaagagcag gtggcaggag gggaatgtct       1740

tctcatgctc cgtgatgcat gaggctctgc acaaccacta cacacagaag agcctctccc       1800

tgtctctggg taaatgagtg ccagggccgg caagcccccg ctccccgggc tctcggggtc       1860

gcgcgaggat gcttggcacg taccccgtct acatacttcc caggcaccca gcatggaaat       1920

aaagcaccca ccactgccct gggcccctgt gagactgtga tggttctttc cacgggtcag       1980

gccgagtctg aggcctgagt gacatgagga attcagatct ggatcc                     2026

<210>   10
<211>   119
<212>   PRT
<213>   murine

<400>   10

Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala Arg Pro Gly Ala
1               5                   10                  15


Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr
            20                  25                  30


Thr Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45


Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Phe
    50                  55                  60


Lys Asp Lys Ala Thr Leu Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr

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```
 65                    70                    75                    80

Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
                85                  90                  95


Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
            100                 105          .          110


Thr Thr Leu Thr Val Ser Ser
            115
  .


<210>   11
<211>   119
<212>   PRT
<213>   artificial sequence

<220>
<223>   de-immunized heavy chain variable region

<400>   11

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15


Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala Thr Arg Tyr
            20                  25                  30


Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
            35                  40                  45


Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Ala Gln Lys Phe
    50                  55                  60


Gln Asp Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr
65                  70                  75                  80


Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95


Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
            100                 105                 110


Thr Thr Val Thr Val Ser Ser
            115


<210>   12
<211>   119
<212>   PRT
<213>   artificial sequence

<220>
<223>   de-immunized heavy chain variable region
                            Page 13
```

<400> 12

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1   5   10   15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala Thr Arg Tyr
            20   25   30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35   40   45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Ala Asp Ser Val
    50   55   60

Lys Gly Arg Phe Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys
            85   90   95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
            100   105   110

Thr Thr Val Thr Val Ser Ser
        115

<210> 13
<211> 119
<212> PRT
<213> artificial sequence

<220>
<223> de-immunized heavy chain variable region

<400> 13

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1   5   10   15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala Thr Arg Tyr
            20   25   30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35   40   45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Phe
    50   55   60

Lys Asp Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85   90   95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
            100   105   110

Thr Thr Val Thr Val Ser Ser
        115

<210>   14
<211>   119
<212>   PRT
<213>   artificial sequence

<220>
<223>   de-immunized heavy chain variable region

<400>   14

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1   5   10   15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala Thr Arg Tyr
            20   25   30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35   40   45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val
    50   55   60

Lys Asp Arg Phe Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85   90   95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
            100   105   110

Thr Thr Val Thr Val Ser Ser
        115

<210>   15
<211>   119
<212>   PRT
<213>   artificial sequence

<220>
<223>   de-immunized heavy chain variable region

<400>   15

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1   5   10   15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr
            20   25   30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35   40   45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Phe
    50   55   60

Lys Asp Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys
            85   90   95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
            100   105   110

Thr Thr Val Thr Val Ser Ser
            115

<210> 16
<211> 119
<212> PRT
<213> artificial sequence

<220>
<223> de-immunized heavy chain variable region

<400> 16

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1   5   10   15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr
            20   25   30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35   40   45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Ala Gln Lys Phe
    50   55   60

Gln Asp Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys

85   90   95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
            100   105   110

Thr Thr Val Thr Val Ser Ser
            115

<210> 17
<211> 119
<212> PRT
<213> artificial sequence

<220>
<223> de-immunized heavy chain variable region

<400> 17

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1   5   10   15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr
            20   25   30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
            35   40   45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val
        50   55   60

Lys Asp Arg Phe Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85   90   95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
            100   105   110

Thr Thr Val Thr Val Ser Ser
            115

<210> 18
<211> 106
<212> PRT
<213> murine

<400> 18

Gln Ile Val Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly
1   5   10   15

Glu Lys Val Thr Met Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met
            20   25   30

Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro Lys Arg Trp Ile Tyr
            35   40   45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ala His Phe Arg Gly Ser
        50   55   60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Gly Met Glu Ala Glu
65   70   75   80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr
                85   90   95

Phe Gly Ser Gly Thr Lys Leu Glu Ile Asn
            100   105

<210>   19
<211>   106
<212>   PRT
<213>   artificial sequence

<220>
<223>   de-immunized light chain variable region

<400>   19

Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1   5   10   15

Glu Arg Ala Thr Leu Thr Cys Ser Ala Ser Ser Ser Ala Ser Tyr Met
            20   25   30

Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Arg Trp Ile Tyr
            35   40   45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser
        50   55   60

Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Asn Ser Leu Glu Ala Glu
65   70   75   80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr
                85   90   95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100   105

<210>   20
<211>   106

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<212> PRT
<213> artificial sequence

<220>
<223> de-immunized light chain variable region

<400> 20

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Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met
                20                  25                  30

Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Arg Trp Ile Tyr
            35                  40                  45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser
        50                  55                  60

Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Asn Ser Leu Glu Ala Glu
65                  70                  75                  80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr
                85                  90                  95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
                100                 105
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<210> 21
<211> 819
<212> DNA
<213> artificial sequence

<220>
<223> de-immunized VH expression cassette

<400> 21

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caaacagaaa aacatgagat cacagttgtc tctacagtta ctgagcacac aggacctcac     120

catgggatgg agctgtatca tcctcttctt ggtagcaaca gctacaggta aggggctcac     180

agtagcaggc ttgaggtctg acatatata tgggtgacaa tgacatccac tttgcctttc     240

tctccacagg tgtccactcc caggtccagc tggtacagtc tggggctgaa gtcaagaaac     300

ctggggcctc agtgaaggtg tcctgcaagg cttctggcta cacggctact aggtacacga     360

tgcactgggt aagacaggcg cctggacaag gtttggaatg gattggatac attaaccctta     420

gccatggata tactaattac gctcagaagt tccaggacag ggtcacaatc actacagaca     480

aatcttccag cacagcctac ttgcaaatga acagcctgaa aactgaggac accgcagtct     540

attactgtgc aagatattat gatgatcatt actgtctcga ctactggggc caaggcacca     600
```
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ctgtgacagt ctcctcaggt gagtccttac aacctctctc ttctattcag cttaaataga   660

ttttactgca tttgttgggg gggaaatgtg tgtatctgaa tttcaggtca tgaaggacta   720

gggacacctt gggagtcaga aagggtcatt gggagcccgg gctgatgcag acagacatcc   780

tcagctccca gacttcatgg ccagagattt ataggatcc   819

<210> 22
<211> 15
<212> PRT
<213> artificial sequence

<220>
<223> signal protein

<400> 22

Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr
1   5   10   15

<210> 23
<211> 617
<212> DNA
<213> artificial sequence

<220>
<223> de-immunized VK expression cassette

<400> 23
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caaacagaaa aacatgagat cacagttctc tctacagtta ctgagcacac aggacctcac   120

catgggatgg agctgtatca tcctcttctt ggtagcaaca gctacaggta aggggctcac   180

agtagcaggc ttgaggtctg acatatata tgggtgacaa tgacatccac tttgcctttc   240

tctccacagg tgtccactcc caaattgttc tcacccagtc tccagcaacc ctctctcttt   300

ctccagggga acgcgccacc ttgacatgca gtgccagctc aagtgcaagt tacatgaact   360

ggtaccagca gaagcccggc aaagctccca aaagatggat ttatgacaca tcaaaactgg   420

cttctggagt accgtctcgc ttcagtggca gtgggtctgg gaccgattac tctctcacaa   480

tcaatagtct ggaagctgaa gatgccgcaa cttattactg ccagcagtgg tcaagtaacc   540

cattcacgtt cggacaaggt acaaaggtgg aaatcaaacg tgagtagaat ttaaactttg   600

cttcctcagt tggatcc   617

<210> 24
<211> 15
<212> PRT
<213> artificial sequence

<220>
<223> signal protein

<400> 24

Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr
1   5   10   15

<210>   25
<211>   467
<212>   PRT
<213>   murine

<400>   25

Met Glu Arg His Trp Ile Phe Leu Leu Leu Ser Val Thr Ala Gly
1   5   10   15

Val His Ser Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala Arg
            20   25   30

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Tyr Thr Phe Thr
            35   40   45

Arg Tyr Thr Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu
    50   55   60

Trp Ile Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln
65   70   75   80

Lys Phe Lys Asp Lys Ala Thr Leu Thr Thr Asp Lys Ser Ser Ser Thr
            85   90   95

Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr
            100   105   110

Tyr Cys Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly
        115   120   125

Gln Gly Thr Thr Leu Thr Val Ser Ser Ala Lys Thr Thr Ala Pro Ser
    130   135   140

Val Tyr Pro Leu Ala Pro Val Cys Gly Asp Thr Thr Gly Ser Ser Val
145   150   155   160

Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Leu
            165   170   175

Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala
            180   185   190

Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Thr
    195   200   205

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Ser Ser Thr Trp Pro Ser Gln Ser Ile Thr Cys Asn Val Ala His Pro
210   215   220

Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Glu Pro Arg Gly Pro Thr
225   230   235   240

Ile Lys Pro Cys Pro Pro Cys Lys Cys Pro Ala Pro Asn Leu Leu Gly
            245   250   255

Gly Pro Ser Val Phe Ile Phe Pro Pro Lys Ile Lys Asp Val Leu Met
            260   265   270

Ile Ser Leu Ser Pro Ile Val Thr Cys Val Val Val Asp Val Ser Glu
        275   280   285

Asp Asp Pro Asp Val Gln Ile Ser Trp Phe Val Asn Asn Val Glu Val
        290   295   300

His Thr Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser Thr Leu
305   310   315   320

Arg Val Val Ser Ala Leu Pro Ile Gln His Gln Asp Trp Met Ser Gly
            325   330   335

Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Asp Leu Pro Ala Pro Ile
            340   345   350

Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser Val Arg Ala Pro Gln Val
        355   360   365

Tyr Val Leu Pro Pro Pro Glu Glu Glu Met Thr Lys Lys Gln Val Thr
370   375.   380

Leu Thr Cys Met Val Thr Asp Phe Met Pro Glu Asp Ile Tyr Val Glu
385   390   395   400

Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn Tyr Lys Asn Thr Glu Pro
            405   410   415

Val Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser Lys Leu Arg Val
            420   425   430

Glu Lys Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser Cys Ser Val Val
        435   440   445

His Glu Gly Leu His Asn His His Thr Thr Lys Ser Phe Ser Arg Thr
450   455   460

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Pro Gly Lys
465

<210> 26
<211> 1570
<212> DNA
<213> murine

<400> 26
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gctgaactgg caagacctgg ggcctcagtg aagatgtcct gcaaggcttc tggctacacc   180

tttactaggt acacgatgca ctgggtaaaa cagaggcctg acagggtct ggaatggatt   240

ggatacatta atcctagccg tggttatact taattacaat cagaagttca aggacaaggc   300

cacattgact acagacaaat cctccagcac agcctacatg caactgagca gcctgacatc   360

tgaggactct gcagtctatt actgtgcaag atattatgat gatcattact gccttgacta   420

ctggggccaa ggcaccactc tcacagtctc ctcagccaaa acaacagccc catcggtcta   480

tccactggcc cctgtgtgtg gagatacaac tggctcctcg gtgactctag gatgcctggt   540

caagggttat ttccctgagc cagtgacctt gacctggaac tctggatccc tgtccagtgg   600

tgtgcacacc ttcccagctg tcctgcagtc tgacctctac accctcagca gctcagtgac   660

tgtaacctcg agcacctggc ccagccagtc catcacctgc aatgtggccc acccggcaag   720

cagcaccaag gtggacaaga aaattgagcc cagagggccc acaatcaagc cctgtcctcc   780

atgcaaatgc ccagcaccta acctcttggg tggaccatcc gtcttcatct tccctccaaa   840

gatcaaggat gtactcatga tctccctgag ccccatagtc acatgtgtgg tggtggatgt   900

gagcgaggat gacccagatg tccagatcag ctggtttgtg aacaacgtgg aagtacacac   960

agctcagaca caaacccata gagaggatta caacagtact ctccgggtgg tcagtgccct   1020

ccccatccag caccaggact ggatgagtgg caaggagttc aaatgcaagg tcaacaacaa   1080

agacctccca gcgcccatcg agagaaccat ctcaaaaccc aaagggtcag taagagctcc   1140

acaggtatat gtcttgcctc caccagaaga agagatgact aagaaacagg tcactctgac   1200

ctgcatggtc acagacttca tgcctgaaga catttacgtg gagtggacca caacgggaa   1260

aacagagcta aactacaaga cactgaacc agtcctggac tctgatggtt cttacttcat   1320

gtacagcaag ctgagagtgg aaaagaagaa ctgggtggaa agaaatagct actcctgttc   1380

agtggtccac gagggtctgc acaatcacca cacgactaag agcttctccc ggactccggg   1440

taaatgagct cagcacccac aaaactctca ggtccaaaga gacacccaca ctcatctcca   1500

tgcttccctt gtataaataa agcacccagc aatgcctggg accatgtaaa aaaaaaaaa   1560

aaaggaattc   1570
                              Page 23

<210> 27
<211> 235
<212> PRT
<213> murine

<400> 27

Met Asp Phe Gln Val Gln Ile Phe Ser Phe Leu Leu Ile Ser Ala Ser
1   5   10   15

Val Ile Ile Ser Arg Gly Gln Ile Val Leu Thr Gln Ser Pro Ala Ile
            20   25   30

Met Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Ser Ala Ser
        35   40   45

Ser Ser Val Ser Tyr Met Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser
    50   55   60

Pro Lys Arg Trp Ile Tyr Asp Thr Ser Lys Leu Ala Ser Gly Val Pro
65   70   75   80

Ala His Phe Arg Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile
            85   90   95

Ser Gly Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp
            100   105   110

Ser Ser Asn Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu Glu Ile Asn
        115   120   125

Arg Ala Asp Thr Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu
    130   135   140

Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe
145   150   155   160

Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg
                165   170   175

Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser
            180   185   190

Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu
        195   200   205

Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser
    210   215   220

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Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225   230   235

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<212> DNA
<213> murine

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catctccagg ggagaaggtc accatgacct gcagtgccag ctcaagtgta agttacatga   180

actggtacca gcagaagtca ggcacctccc ccaaaagatg gatttatgac acatccaaac   240

tggcttctgg agtccctgct cacttcaggg gcagtgggtc tgggacctct tactctctca   300

caatcagcgg catggaggct gaagatgctg ccacttatta ctgccagcag tggagtagta   360

acccattcac gttcggctcg gggacaaagt tggaaataaa ccgggctgat actgcaccaa   420

ctgtatccat cttcccacca tcçagtgagc agttaacatc tggaggtgcc tcagtcgtgt   480

gcttcttgaa caacttctac cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg   540

aacgacaaaa tggcgtcctg aacagttgga ctgatcagga cagcaaagac agcacctaca   600

gcatgagcag caccctcacg ttgaccaagg acgagtatga cgacataac agctatacct   660

gtgaggccac tcacaagaca tcaacttcac ccattgtcaa gagcttcaac aggaatgagt   720

gttagagaca aaggtcctga cgccacca ccagctccca gctccatcct atcttccctt   780

ctaaggtctt ggaggcttcc ccacaagcgc ttaccactgt tgcggtgctc taaacctcct   840

cccacctcct tctcctcctc ctcccttttcc ttggctttta tcatgctaat atttgcagaa   900

aatattcaat aaagtgagtc tttgccttga aaaaaaaaaa aaa   943

<210> 29
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<212> PRT
<213> murine

<400> 29

Gly Val His Ser Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala
1   5   10   15

Arg Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr
            20   25   30

Phe Thr Arg Tyr Thr Met His Trp Val Lys Gln Arg Pro Gly Gln Gly
            35   40   45

Leu Glu Trp Ile Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr

Asn Gln Lys Phe Lys Asp Lys Ala Thr Leu Thr Thr Asp Lys Ser Ser
65   70   75   80

Ser Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala
                85   90   95

Val Tyr Tyr Cys Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr
                100   105   110

Trp Gly Gln Gly Thr Thr Leu Thr Val Ser Ser
            115   120

<210> 30
<211> 110
<212> PRT
<213> murine

<400> 30

Gly Val His Ser Gln Ile Val Leu Thr Gln Ser Pro Ala Ile Met Ser
1   5   10   15

Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Ser Ala Ser Ser Ser
                20   25   30

Val Ser Tyr Met Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro Lys
            35   40   45

Arg Trp Ile Tyr Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ala His
    50   55   60

Phe Arg Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Gly
65   70   75   80

Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser
                85   90   95

Asn Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu Glu Ile Lys
                100   105   110

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<213> human

<400> 31

Glu Ser Lys Tyr Gly Pro Pro Cys Pro Ser Cys Pro
1   5   10

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<400> 32

Ala Pro Glu Phe Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
1   5   10   15

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
            20   25   30

Val Val Asp Val Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr
            35   40   45

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
        50   55   60

Gln Phe Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
65   70   75   80

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys
                85   90   95

Gly Leu Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys
                100   105   110

<210> 33
<211> 107
<212> PRT
<213> human

<400> 33

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1   5   10   15

Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe
            20   25   30

Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu
        35   40   45

Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe
        50   55   60

Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly
65   70   75   80

Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr

Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly Lys
            100   105

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<213>   human

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Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro
1   5   10

<210>   35
<211>   109
<212>   PRT
<213>   human

<400>   35

Ala Pro Pro Val Ala Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro
1   5   10   15

Lys Asp Thr Leu Asn Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val
            20   25   30

Val Asp Val Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val
            35   40   45

Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
    50   55   60

Phe Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln
65   70   75   80

Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly
            85   90   95

Leu Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys
            100   105

<210>   36
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<212>   PRT
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<400>   36

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu
1   5   10   15

Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe
        20   25   30

Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu
        35   40   45

Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe
        50   55   60

Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly
65   70   75   80

Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr
                85   90   95

Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly Lys
                100   105

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<220>
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<212>   DNA
<213>   artificial sequence

<220>
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<210>   39
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<220>
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tgggtaagac aggcgcctgg acaaggtttg g   31

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<400> 40
gtccaggcgc ctgtcttacc cagtgcatc   29

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<400> 41
aggcgcctgt cttacccagt gcatcgtgta cctagtagcc gtgtagcc   48

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<211> 43
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<213> artificial sequence

<220>
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<400> 42
caatcagaag ttcaaggaca gggtcacaat cactacagac aaa   43

<210> 43
<211> 43
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<213> artificial sequence

<220>
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<400> 43
cgctcagaag ttccaggaca gggtcacaat cactacagac aaa   43

<210> 44
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<212> DNA
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<220>
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<400> 44
cgctgacagt gtcaagggca ggttcacaat cactacagac aaa   43

<210> 45
<211> 43
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<213> artificial sequence

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<400> 46
gtccttgaac ttctgattgt aattagtata tccacgg   37

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<400> 49
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<400> 53
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<400> 55
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<400>  62
cttctgctgg taccagttca tgtaacttgc acttgagc                              38


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<220>
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<400>  63
gggtctggga ccgattactc tctcacaatc aatagtctgg aagctgaag                  49


<210>  64
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<400>  64
gtaatcggtc ccagacccac tgccactgaa gcgagacggt actccag                    47


<210>  65
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<400>  65
ttcacgttcg dacaaggtac aaaggtggaa atcaaacg                              38


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<400>  66
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<400> 68
ctgaatggat ccaactgagg aagcaaagtt taaattctac tcacg   45

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<220>
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<400> 69
caaattgttc tcacccagtc tccagcaa   28

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<220>
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<400> 70
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<400> 74
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<210> 75
<211> 122
<212> PRT
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<220>
<223> de-immunized OKT3 VH

<400> 75

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1   5   10   15

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala
                20   25   30

Thr Arg Tyr Thr Met His Trp Tyr Arg Gln Ala Pro Gly Gln Gly Leu
            35   40   45

Glu Trp Ile Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Ala
        50   55   60

Gln Lys Phe Gln Gln Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser
65   70   75   80

Thr Ala Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val
                85   90   95

Tyr Tyr Cys Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp
            100   105   110

Gly Gln Gly Thr Thr Val Thr Val Ser Gly
            115   120

<210>   76
<211>   110
<212>   PRT
<213>   artificial sequence

<220>
<223>   de-immunized OKT3 VK

<400>   76

Gly Val His Ser Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser
1   5   10   15

Leu Ser Pro Gly Glu Arg Ala Thr Leu Thr Cys Ser Ala Ser Ser Ser
            20   25   30

Ala Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys
            35   40   45

Arg Trp Ile Tyr Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg
        50   55   60

Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Asn Ser
65   70   75   80

Leu Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser
            85   90   95

Asn Pro Phe Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100   105   110

<210>   77
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<212>   DNA
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<220>
<223>   reverse primer

<400>   77
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<211>   23
<212>   DNA
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<220>
<223> primer

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gttttcccag tcacgacgtt gta   23

<210> 79
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<212> DNA
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<220>
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<400> 79
cttgcagcct ccaccaaggg cccatccgtc   30

<210> 80
<211> 25
<212> DNA
<213> artificial sequence

<220>
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<400> 80
cccttggtgg aggctgcaag agagg   25

<210> 81
<211> 33
<212> DNA
<213> artificial sequence

<220>
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<400> 81
gagcctctcc ctgtctctgg gtaaatgagt gcc   33

<210> 82
<211> 35
<212> DNA
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<220>
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<400> 82
tcatttaccc agagacaggg agaggctctt ctgtg   35

<210> 83
<211> 35
<212> DNA
<213> artificial sequence

<220>
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<400> 83
tacccggggga tccagatctg aattcctcat gtcac   35